REMARKS

This paper is filed in response to the Office Action mailed December 15, 2009. Claims 1-14 were pending in the application. Claim 1 and 9 have been amended. No claims have beenadded or canceled. Therefore, claims 1-14 are still pending in the application and are submitted for reconsideration.

Request for Telephone Interview

If a final rejection is considered, the Examiner is respectfully requested to contact the undersigned by email to owend@howrey.com in order to schedule a telephone interview.

Rejection of Claims 1-14

Claims 1-14 were rejected under 35 U.S.C. § 102(b) as being anticipated by DE 10062606 (the '606 reference).

Claims 1 and 9 have now been amended. Applicants respectfully traverse the rejections for the reasons provided below.

Claims 1 and 9 have been amended to clarify that the model is a model of the vehicle chassis which continuously identifies the parameters of the chassis and that a continuous simulatory prognosis of the vehicle chassis is compiled using these identified parameters. A basis for this amendment may be found e.g. in paragraphs 0020 and 0030 of the application.

Claim 1 is directed to a method for monitoring the state of a vehicle chassis, comprising the following steps:

- measuring physical variables on the chassis by means of sensors;
- providing a model of the vehicle chassis which continuously identifies parameters of the vehicle chassis and uses such parameters to continuously compile modeled variables in a simulatory prognosis of the vehicle chassis behavior;
- comparing the measured variables with the modeled variables by means of a processing unit, wherein the modeled variables are determined from specific variables;
- performing a classification into classes of causes on the basis of the comparison; and
- evaluating a result of the classification.

Claim 9 relies on similar limitations.

The problem addressed by the invention is that prior methods for monitoring rail vehicles relied on measuring vibrations or impacts on the chassis during operation of the vehicle and compare these measured variables with pre-defined limits to assess whether maintenance or corrective action is required (para. 0005). The invention improves on the prior art by continuously monitoring the state of chassis components affected by wear or ageing to construct a "state-related" inspection and maintenance regime (para. 0007, 0010).

Claims 1 and 9 require a dynamic model of the vehicle chassis. The model is a software representation of the vehicle chassis used for monitoring the state of the chassis (para. 0026, 0038). The model of the vehicle chassis "continuously identifies parameters of the vehicle chassis." The distinction between a variable and a parameter should be noted. For example, as one of skill in the art knows, mathematical functions have one or more arguments that are designated by variables in the definition of the function, while the definition can also contain parameters. The variables are mentioned in the list of arguments that the function takes, but the parameters are not. When parameters are present, the definition actually defines a whole family of functions, one for every valid set of values of the parameters. For instance one could define a general quadratic function by defining $f(x) = ax^2 + bx + c$. Here the variable x designates the function argument, but a, b, and c are parameters that determine which quadratic function one is considering (see e.g. http://en.wikipedia.org/wiki/Parameter#Parameters_in_mathematics_and_science).

In the context of the method of claim 1 (and device of claim 9), a parameter of a complex system like a vehicle chassis is a magnitude which qualitatively differs from a measured or modeled variable. A parameter defines a function (or family of functions) comprising the model and thus defines the model. It is nominally fixed, but may be recalculated as provided for in the claimed method. A measured or modeled variable is a magnitude that intrinsically (and strongly) varies over a comparatively short period of time, and is used as an input or output.

Claims 1 and 9 require a model of the vehicle chassis in which the parameters of the vehicle chassis of the model are continuously recalculated. The updated parameters are used in the model to "continuously compile modeled variables in a simulatory prognosis of the vehicle chassis behavior." The updated model based on the continuously identified parameters is used to generate predicted modeled variables which can be compared to the

measured variables (see e.g. para. 0026). For example, the updated model based on the continuously identified parameters is used to generate the predicted amount of vibration of the bogie, which is compared with the actual measured vibration of the bogie.

The '606 reference

The '606 reference discloses a method of monitoring in which frequency spectra of voltage, current or speed of rotation of the drive unit are measured as physical variables and compared with a process model 6 of normal operation to separate damage-relevant interference frequency portions and frequency portions characteristic of normal operation (see e.g. '606, paragraphs 0013, 0024, Fig. 1). The result of this comparison undergoes spectral analysis to classify the interference frequency spectra into various categories (continuous, sporadic, conditional, random) (see e.g. '606, paragraph 0025, Fig. 1).

The classified interference frequency spectra of the damage-relevant measured physical variables from one motor are then correlated with those of another motor (see e.g. '606, paragraph 0030, Fig. 2). A preselection 28 is then performed on the results of the correlation, to differentiate between interference frequency portions due to roadway damage, vehicle mechanism damage, or motor damage, and a defect model 30 is used to further differentiate certain "damage-typical interference frequency patterns" (see e.g. '606, paragraph 0034, 0035, Fig. 2). The resulting output is further processed by statistical evaluation processes 32, decision logic unit 34, threshold value stage 36, and action stage 38 (see e.g. '606, paragraph 0036-0038, Fig. 2).

The principal focus of the '606 reference is to provide a system which can use measurements of voltage, current or speed of the motors, which are already being made, to detect interference frequency patterns which indicate certain types of damage. The system uses two different models. The process model 6 is an "rpm-adapted" model, which presumably refers to the model taking account of the rpm of the electric motor from which measurements are taken (see e.g. '606, paragraph 0025, 0032). The defect model 30 defines interference frequency patterns in the measured variables which are typical of damage ("damage-typical interference frequency patterns"), and uses them as reference patterns for various undercarriage components of the vehicle being monitored; e.g. by comparing the interference frequency patterns in the measured variables with the reference patterns in the defect model 30, the system can differentiate between various interference frequency patterns to find those indicative of certain types of damage.

The process model 6 and the defect model 30 are both static models, one describing the normal behavior and one describing certain reference patterns used to differentiate between different types of damage.

Claim 1 requires "providing a model of the vehicle chassis which continuously identifies parameters of the vehicle chassis and uses such parameters to continuously compile modeled variables in a simulatory prognosis of the vehicle chassis behavior." As noted above, there is nothing in the disclosure of the '606 reference to indicate that the process model 6 or the defect model 30 have continuously updated parameters as required by claim 1.

Furthermore, there is no disclosure in the '606 reference of generating modeled variables from the continuously updated model, and no disclosure of generating modeled variables in a simulatory prognosis (i.e. prediction) of the vehicle chassis behavior.

Claim 1 also requires "comparing the measured variables with the modeled variables by means of a processing unit..." Although the '606 reference discloses comparing measured variables with modeled variables (comparison 8 of measured state and computed state), this comparison is made before the other processing, and the computed state is generated from the static process model 6.

Lastly, claim 1 requires "performing a classification into classes of causes on the basis of the comparison." The classification into classes of causes in the '606 reference is made on the basis of a spectral frequency analysis, a correlation with data from another motor, and on the basis of reference patterns in the defect model 30. It is not made on the basis of the comparison of measured variables and modeled variables generated from a continuously updated model.

In view of the amendments and arguments above, the '606 reference fails to disclose or give hint to a model continuously identifying the parameters of the chassis and continuously generating a simulatory prognosis using these identified parameters. Consequently, the '606 reference neither anticipates nor renders obvious amended independent claims 1 and 9. Claims 2-8 depend from claim 1, and claims 10-14 depend from claim 9, and are thus patentable on that basis.

In view of the above, Applicants respectfully request withdrawal of the rejections and allowance of claims 1-14.

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Extension of Time

Any extension of time that may be deemed necessary to further the prosecution of this application is hereby requested.

Authorization to Charge Fees

The Commissioner is authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 08-3038, referencing the docket number shown above.

Authorization to Communicate via email

Pursuant to MPEP 502.03, authorization is hereby given to the USPTO to communicate with Applicant's representative concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file. Applicant's representative, David P. Owen, can be reached at email address owend@howrey.com.

The Examiner may also contact the undersigned by telephone at the number given below in order to resolve any questions (note, this telephone number is an Amsterdam phone number, Amsterdam time is 6 hours ahead of US east coast time).

Respectfully submitted,

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